

# PLANT TRANSPORT

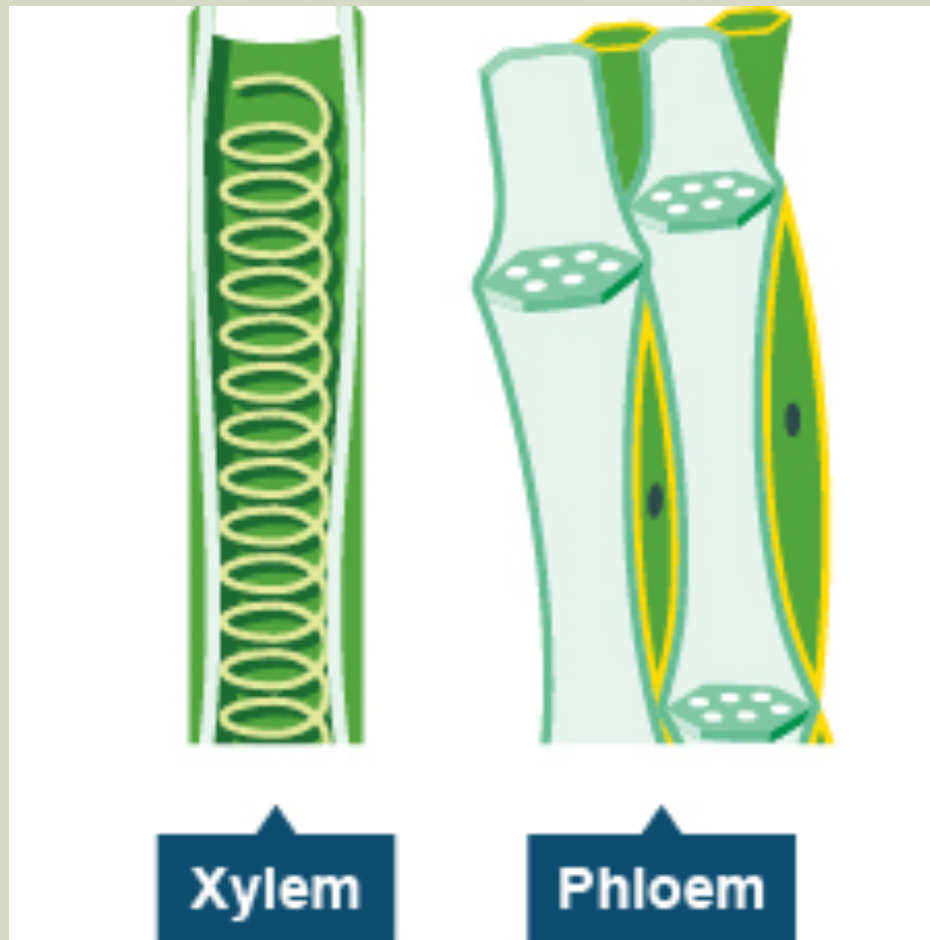
Chapter 8

# TRANSPORT SYSTEM

- What transports material in the plant?

# TRANSPORT SYSTEM

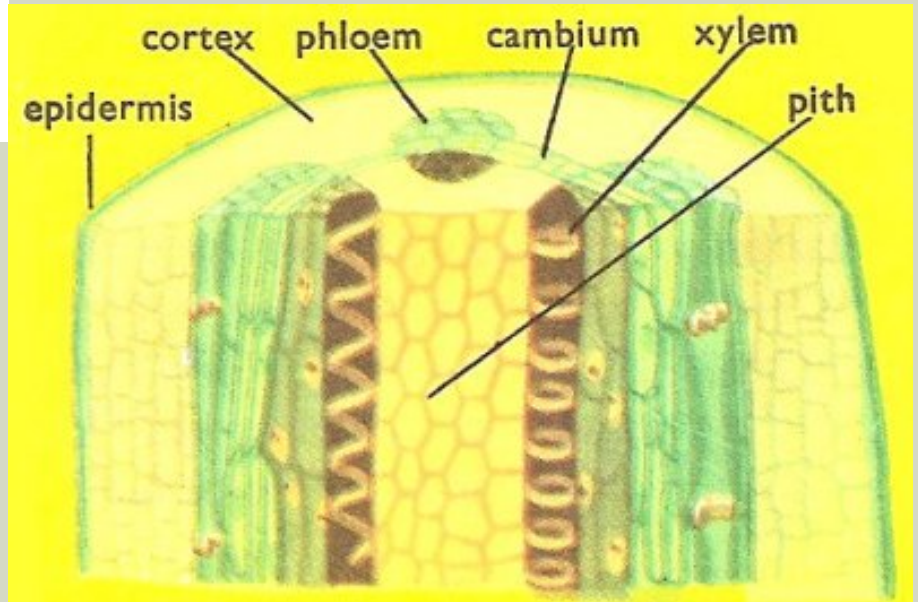
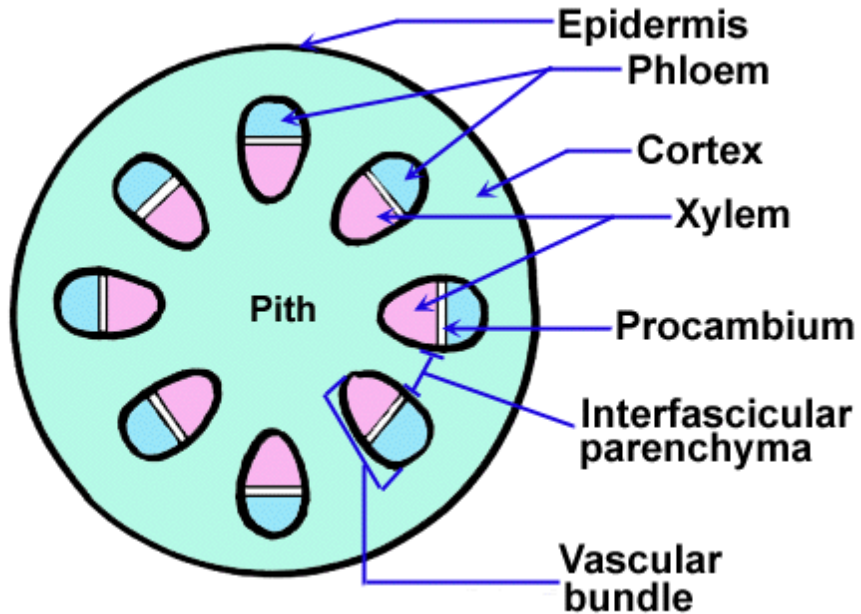
- What transports material in the plant?



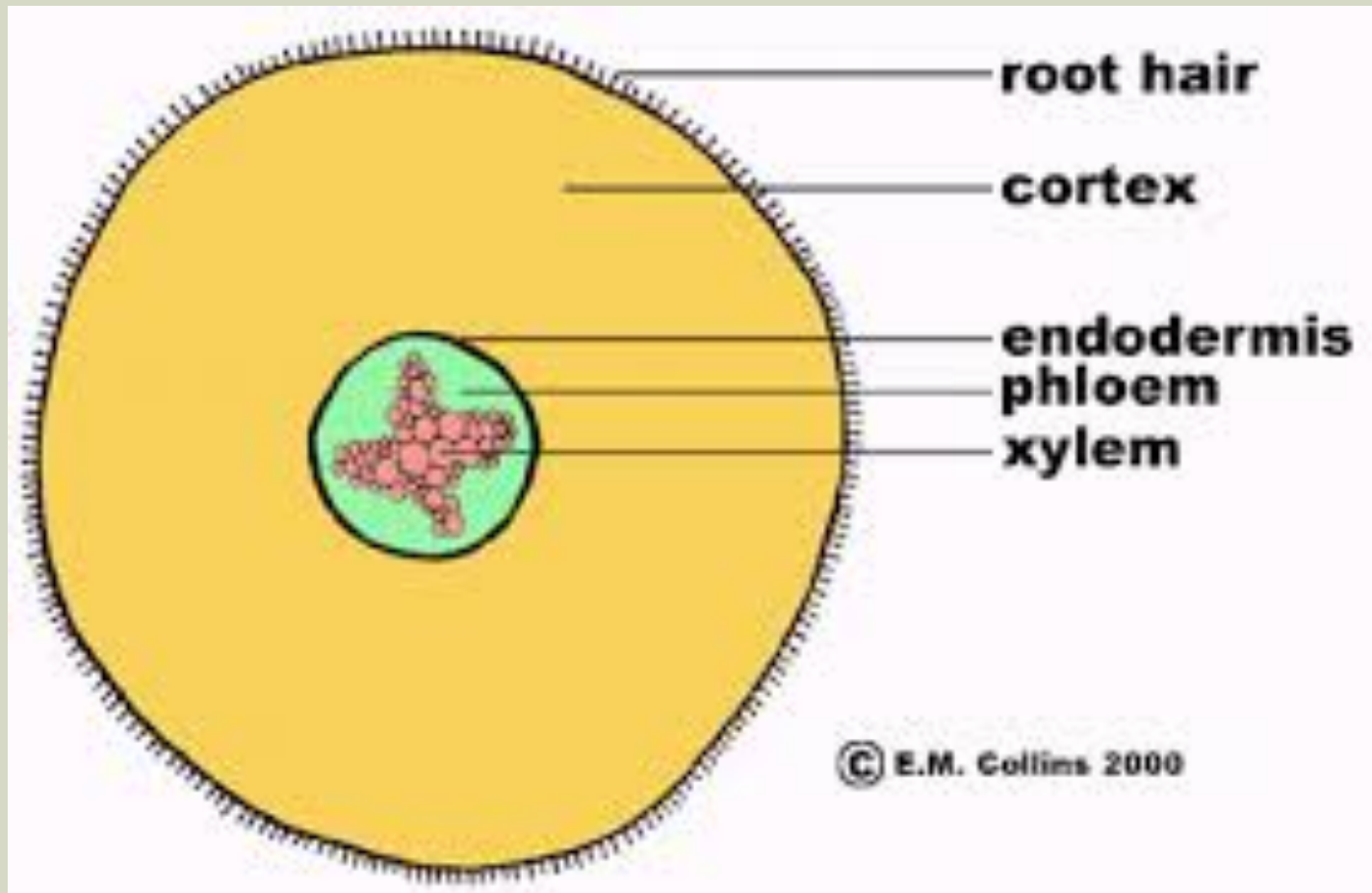
# TRANSPORT SYSTEM

- What transports material in the plant? – xylem and phloem
- Fluid flows in the same direction within each tube (mass flow).
- Xylem tissue:
  - transports water and mineral ions from the roots to the stem to the leaves, flowers and fruits.
  - Transport is only in one direction (roots → stems → leaves)
  - Made from dead cells
- Phloem tissue:
  - Transports sucrose, amino acids, hormones (control cell division for growth) throughout plant
  - Made from living cells
  - Substances transported in TWO directions:
    - Downwards: leaves → roots
    - Upwards: leaves → flowers, fruits, and buds /// Storage organs → new stems and leaves

# ROOT STRUCTURE

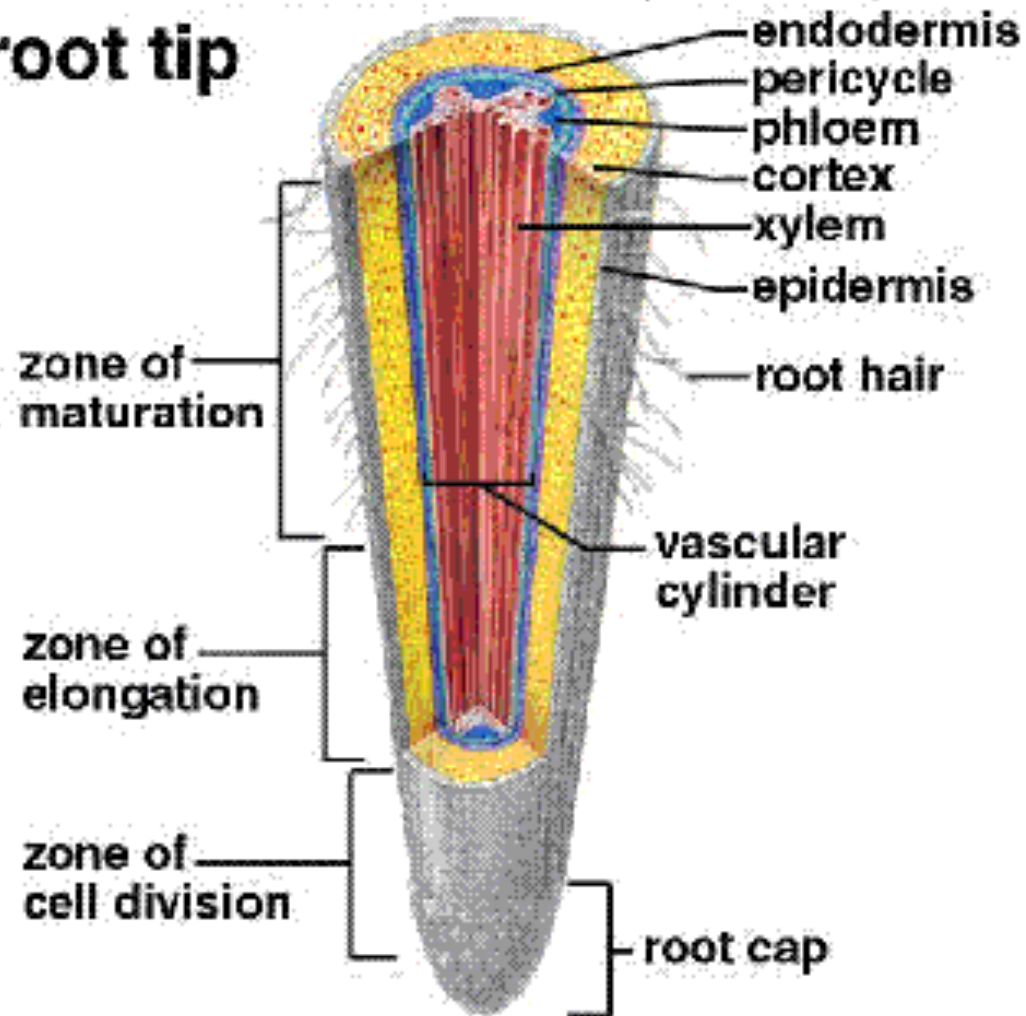


# ROOT STRUCTURE



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## Dicot root tip



# ROOT STRUCTURE

- Complete the table with the function of each part of the root

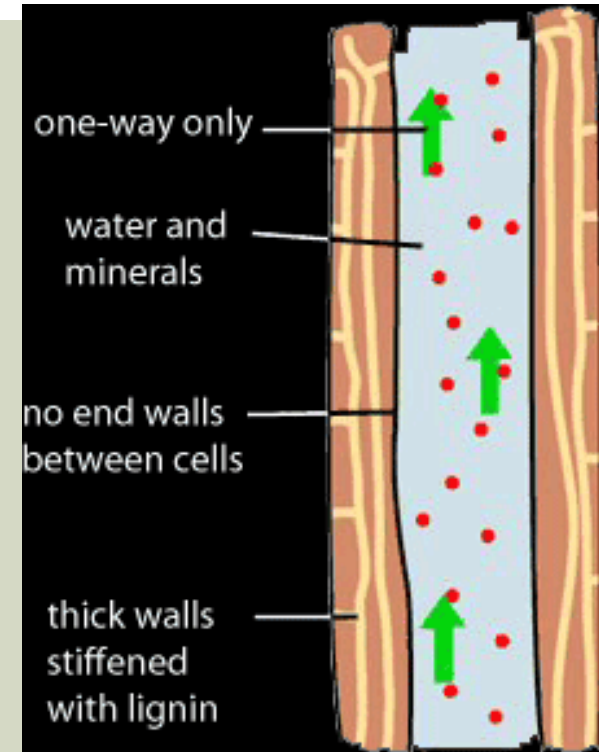
structure	function
Root hairs	
phloem	
Root cap	
cortex	
xylem	
Root tip	

# COMPARISON

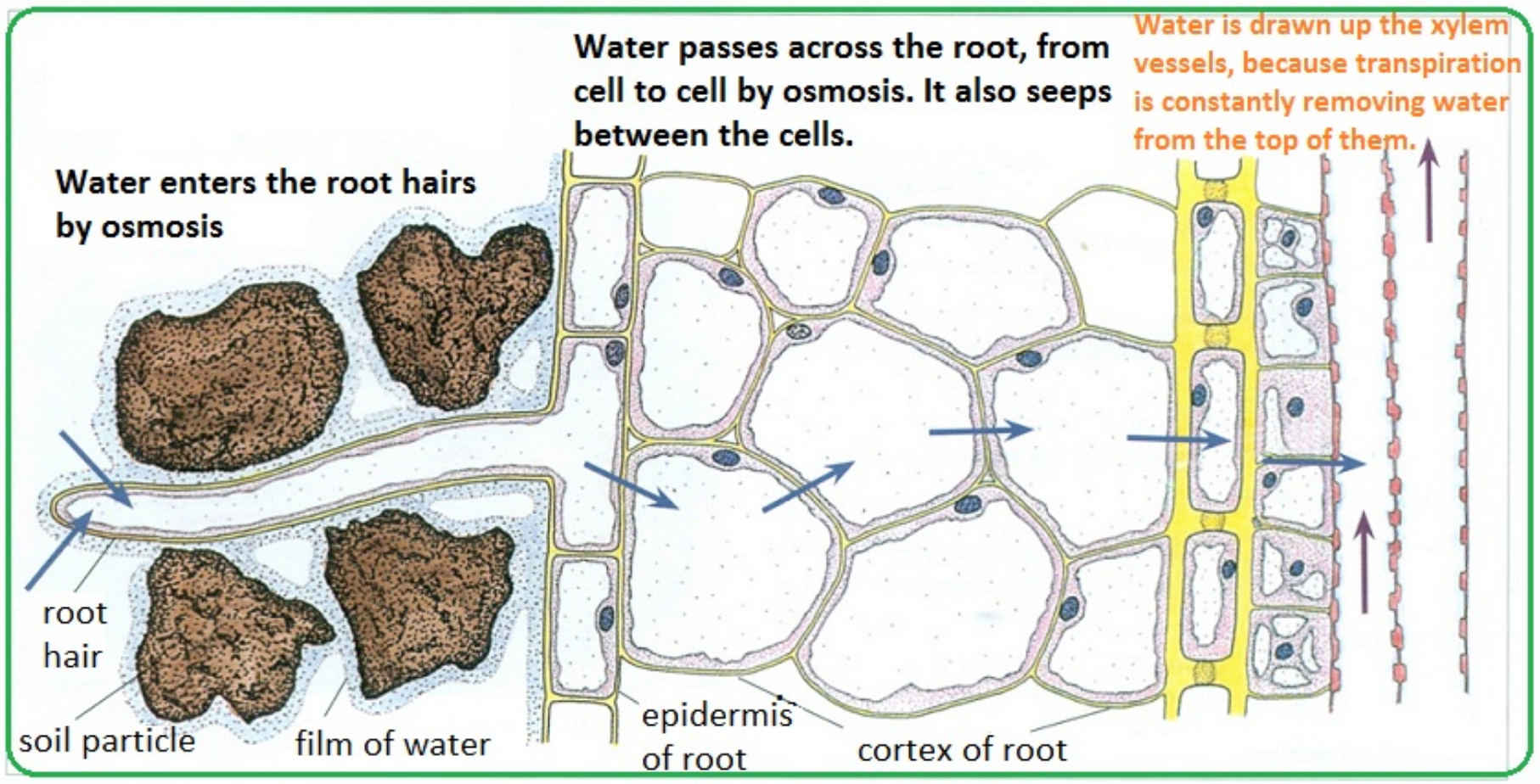
Tissue	Process	What is moved	Structure
Xylem	Transpiration	Moves water and minerals from roots to leaves	Columns of hollow, dead reinforced cells
Phloem	Translocation	Moves food substances from leaves to rest of plant	Columns of living cells

# TRANSPIRATION

- Root hairs absorb water by osmosis
- Soil water: water + minerals
- Root hair cells are thin, permeable, and provide large surface area to absorb water
- Water passes from root hair → cortex → xylem

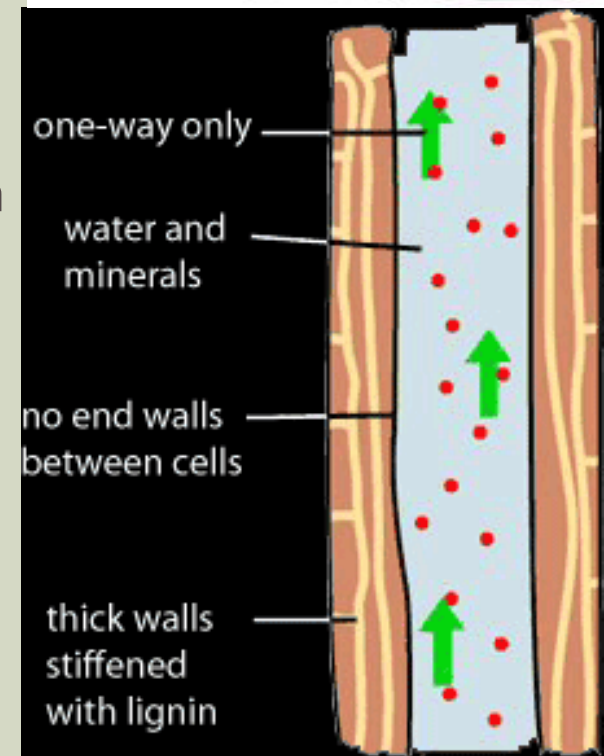
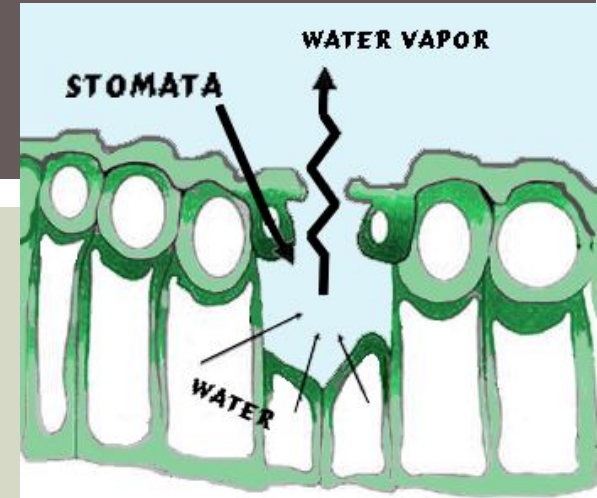


# TRANSPIRATION



# TRANSPIRATION

- Water is pulled up the xylem by evaporation (transpiration pull)
- Enters the spongy mesophyll cells
- Evaporates and exits to atmosphere from stoma
- Transpiration: evaporation of water from the surface of the leaves and the diffusion of water vapor to the atmosphere through stomata
- Transpiration occurs mostly in daytime a stomata is open
- At very hot temperatures, stomata is closed during daytime



# TRANSPIRATION

- Plant do get enough water → start to wilt
- Cells not turgid → less plant support
- Good or bad?



Turgid cell from a leaf  
with enough water



**Turgid plant**

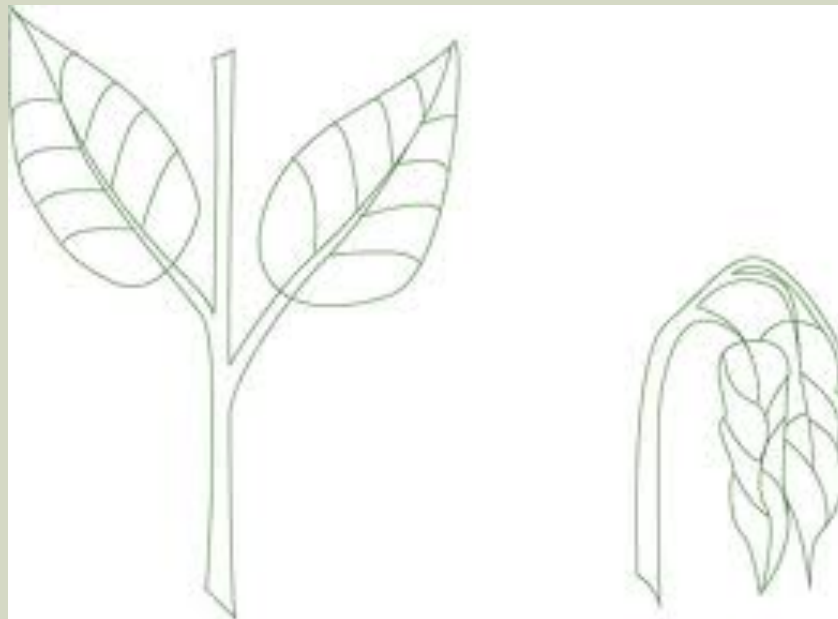
Flaccid cell from a  
leaf with no water



**Flaccid plant**

# TRANSPIRATION

- Plant do get enough water → start to wilt
- Cells not turgid → less plant support
- Good or bad?
- Less direct sunlight if wilted to reduce water lose



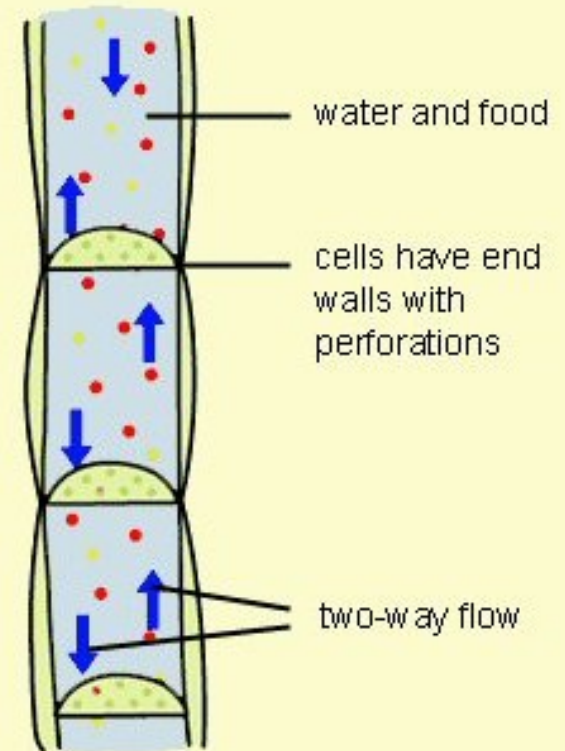
# TRANSPIRATION

## ■ Factors that affect transpiration rate

Factor	Description	Explanation
Light	In bright light transpiration increases	The stomata (openings in the leaf) open wider to allow more carbon dioxide into the leaf for photosynthesis
Temperature	Transpiration is faster in higher temperatures	Evaporation and diffusion are faster at higher temperatures
Wind	Transpiration is faster in windy conditions	Water vapour is removed quickly by air movement, speeding up diffusion of more water vapour out of the leaf
Humidity	Transpiration is slower in humid conditions	Diffusion of water vapour out of the leaf slows down if the leaf is already surrounded by moist air

# TRANSLOCATION

- Transport of food (sucrose, amino acids, fatty acids) in solution in the phloem



phloem vessel

# COMPARISON

